

TECHNICAL INFORMATION

makita

PRODUCT

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Model No. ► HR2450, HR2451, HR2452

Description ► 24mm (15/16") Rotary Hammer

CONCEPT AND MAIN APPLICATIONS

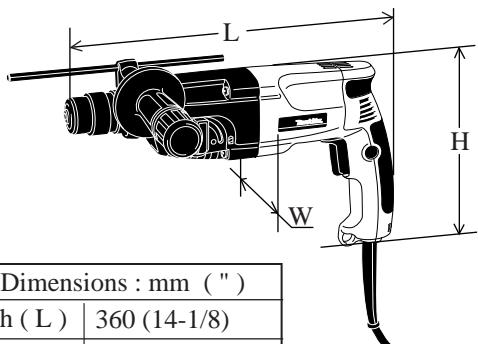
The above models are the advanced version of MAKITA's famous 3-modes rotary hammer HR2400.

Each new model features :

HR2450 : with variable speed and reverse switch

HR2451 : with variable switch without reverse switch

HR2452 : with single speed switch without reverse switch



Dimensions : mm (")	
Length (L)	360 (14-1/8)
Height (H)	204 (8)
Width (W)	72 (2-13/16)

► Specification

Voltage (V)	Current (A)	Cycle (Hz)	Continuous Rating (W)		Max. Output(W)
			Input	Output	
110	7.5	50 / 60	780	370	650
120	6.7	50 / 60	780	370	650
220	3.7	50 / 60	780	370	650
230	3.6	50 / 60	780	370	650
240	3.4	50 / 60	780	370	650

Model No.	HR2450	HR2451	HR2452
Power input : W	780	780	780
No load speed : (min -1 = rpm)	0 - 1,100	0 - 1,100	1,100
Blows per min. :(bpm=min -1)	0 - 4,500	0 - 4,500	4,500
Single blow energy (J)	2.7	2.7	2.7
Variable switch	Yes	Yes	No
Reverse switch	Yes	No	No
Bit type	SDS max 		
SDS plus 	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
SDS top 			
Spline 			
Hex 			
Max. diameter : mm (")	* 24 (15/16)	* 24 (15/16)	* 24 (15/16)
Max. core bit diameter: mm (")	54 (2-1/8)	54 (2-1/8)	54 (2-1/8)
Protection from electric shock	by double insulation	by double insulation	by double insulation
Cord length : m (ft)	** 4 (13.1)	** 4 (13.1)	** 4 (13.1)
Net weight :Kg (lbs)	2.4 (5.3)	2.4 (5.3)	2.4 (5.3)

* 25mm (1") for USA.

** 2.5m (8.2) for Asia ** 2.0m (6.6) for Australia

► Standard equipment

* Stopper pole 1 pc.

* Side grip 1 pc.

* Plastic carrying case 1 pc.

< Note > The standard equipment for the tool shown may differ from country to country.

► Repair

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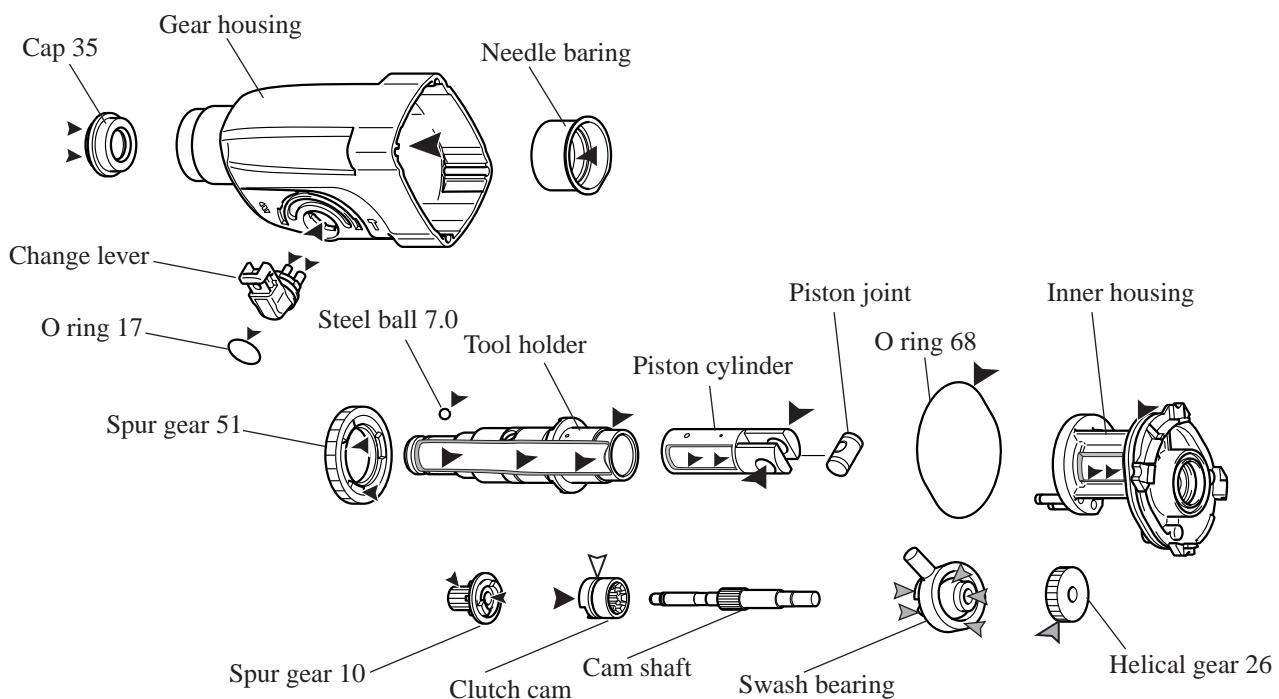
< 1 > Lubrication

Apply the following MAKITA grease to protect parts and product from unusual abrasion.

* Grease RA No.1 (Brown) to the portions marked with black triangle

* Grease FA No.2 to the portions marked with gray triangle

* Disulphide molybdenum alloyed grease to the portion marked with white triangle



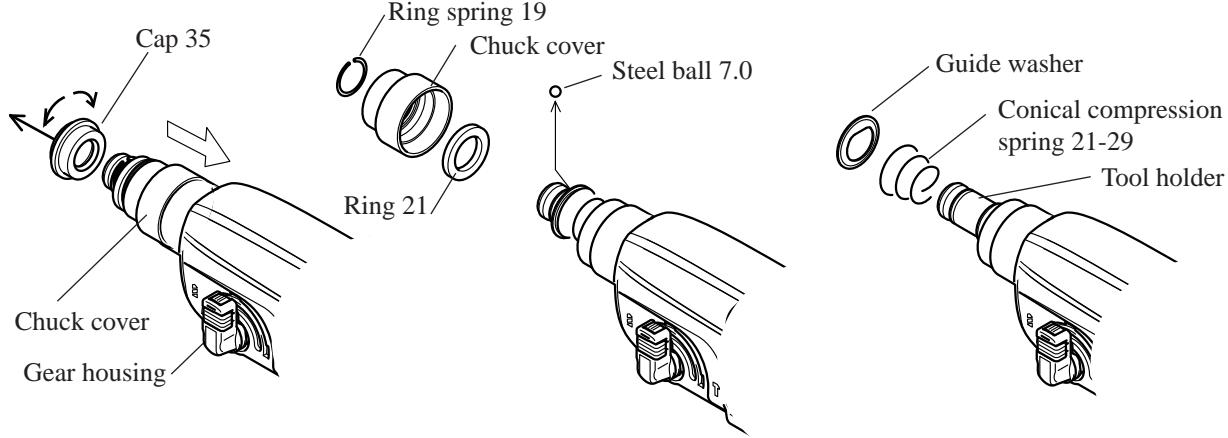
Cap 35	Grease RA No.1 (Brown)	Inner lip of bit inserting side
Gear housing	Grease RA No.1 (Brown) : 60g	Inner portion where the mechanical parts are installed. Groove for O ring 17 assembling portion
Needle bearing	Grease RA No.1 (Brown)	Inner ring
Change lever	Grease RA No.1 (Brown)	Top of the pins
O ring 17	Grease RA No.1 (Brown)	Whole part
Spur gear 51	Grease RA No.1 (Brown)	Inner portion where tool holder contacts Convex portion of cam
Steel ball 7.0	Grease RA No.1 (Brown)	Whole part
Tool holder	Grease RA No.1 (Brown)	Inner portion where piston cylinder contacts The portion where inner housing contacts
Piston cylinder	Grease RA No.1 (Brown)	Inner portion where striker contacts The portion where piston joint is assembled
O ring 68	Grease RA No.1 (Brown)	Whole part
Inner housing	Grease RA No.1 (Brown)	Inner portion where tool holder contacts The groove where O ring 68 is assembled
Spur gear 10	Grease RA No.1 (Brown)	Spiral portion The hole where cam shaft contacts
Clutch cam	Grease RA No.1 (Brown)	Convex portion of cam
	Disulphide molybdenum alloyed grease	Whole of groove portion
Swash bearing 10	Grease FA No.2	Inner portion where cam shaft contacts The surface where helical gear 26 contacts The portion where balls are installed Convex portion of cam
Helical gear 26	Grease FA No.2	Whole of teeth portion

< 2 > Disassembling chuck section

1. Slide chuck cover in the direction of gear housing, and pull out cap 35 by turning. See Fig. 1.
2. Take off ring spring 19. Then, the following parts can be disassembled from tool holder. See Fig. 1A.

* Chuck cover
* Ring 21

3. Take off steel ball 7.0 with which guide washer and conical compression spring 21-29 are held. See Fig. 1A.
Then, guide washer and conical compression spring 21-29 can be disassembled from tool holder. See Fig. 1B.

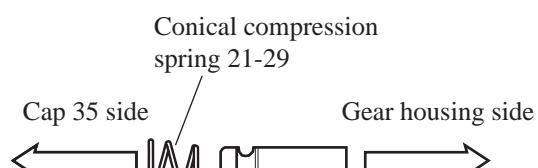


< 3 > Assembling chuck section

1. Apply grease to steel ball 7.0 and cap 35 referring to < 1 > Lubrication at page 2.
2. Assemble conical compression spring 21-29 and guide washer, and hold guide washer with steel ball 7.0. See Fig. 1B and Fig. 1A.
3. Assemble ring 21 and chuck cover to tool holder. And then, hold them with ring spring 19. See Fig. 1A.
4. Slide chuck cover in the direction of gear housing, and assemble cap 35 by turning. See Fig. 1.

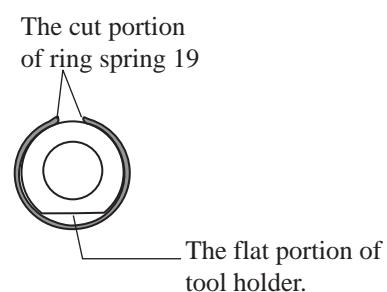
< Note in assembling >

- A. Pay attention to the assembling direction of conical compression spring 21-29.



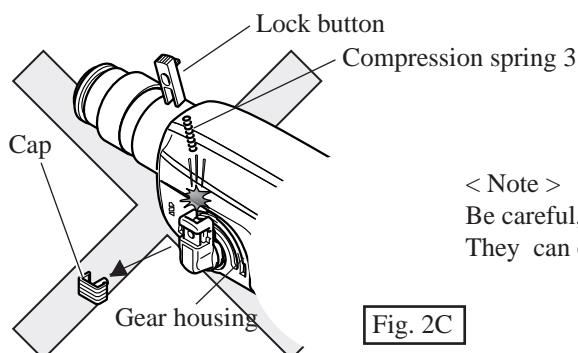
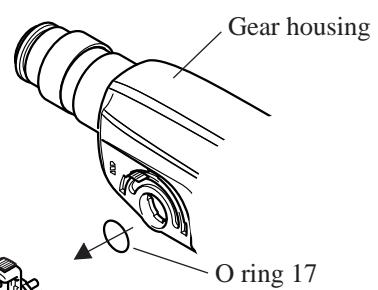
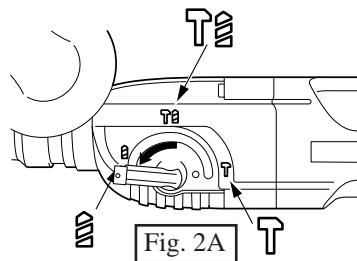
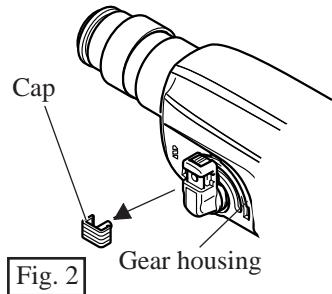
The small portion : Gear housing side
The large portion : Cap 35 side

- B. The cut portion of ring spring 19 has to come to the opposite side of the flat portion of tool holder.



< 4 > Disassembling change lever

1. Separate cap from change lever. See Fig. 1.
2. Fully turn change lever in the direction of drill mode. Then, change lever can be pulled out from gear housing. See Fig. 2A and Fig. 2B

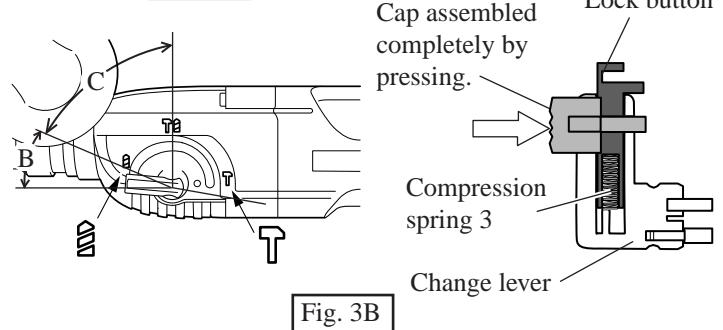
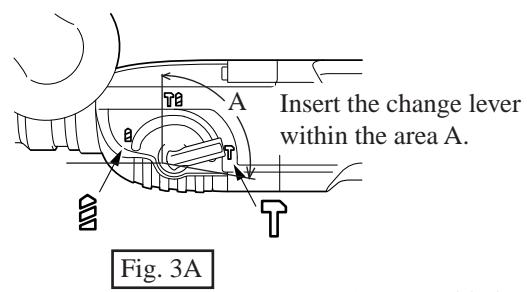
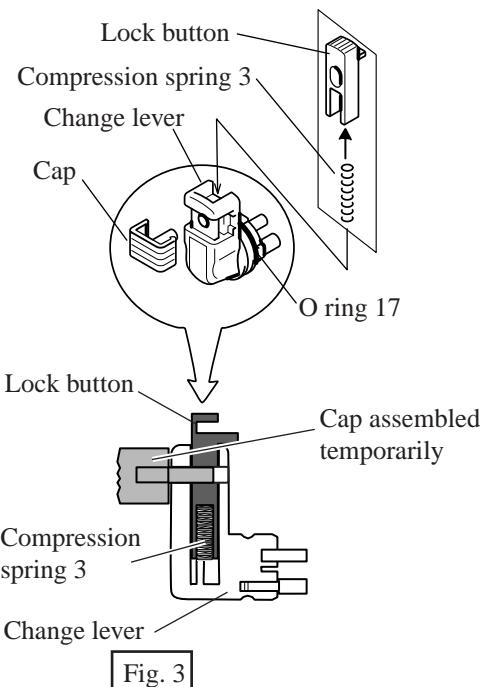


< Note >

Be careful, not to lose lock button and compression spring 3. They can easily spring off. See Fig. 2C.

< 5 > Assembling change lever

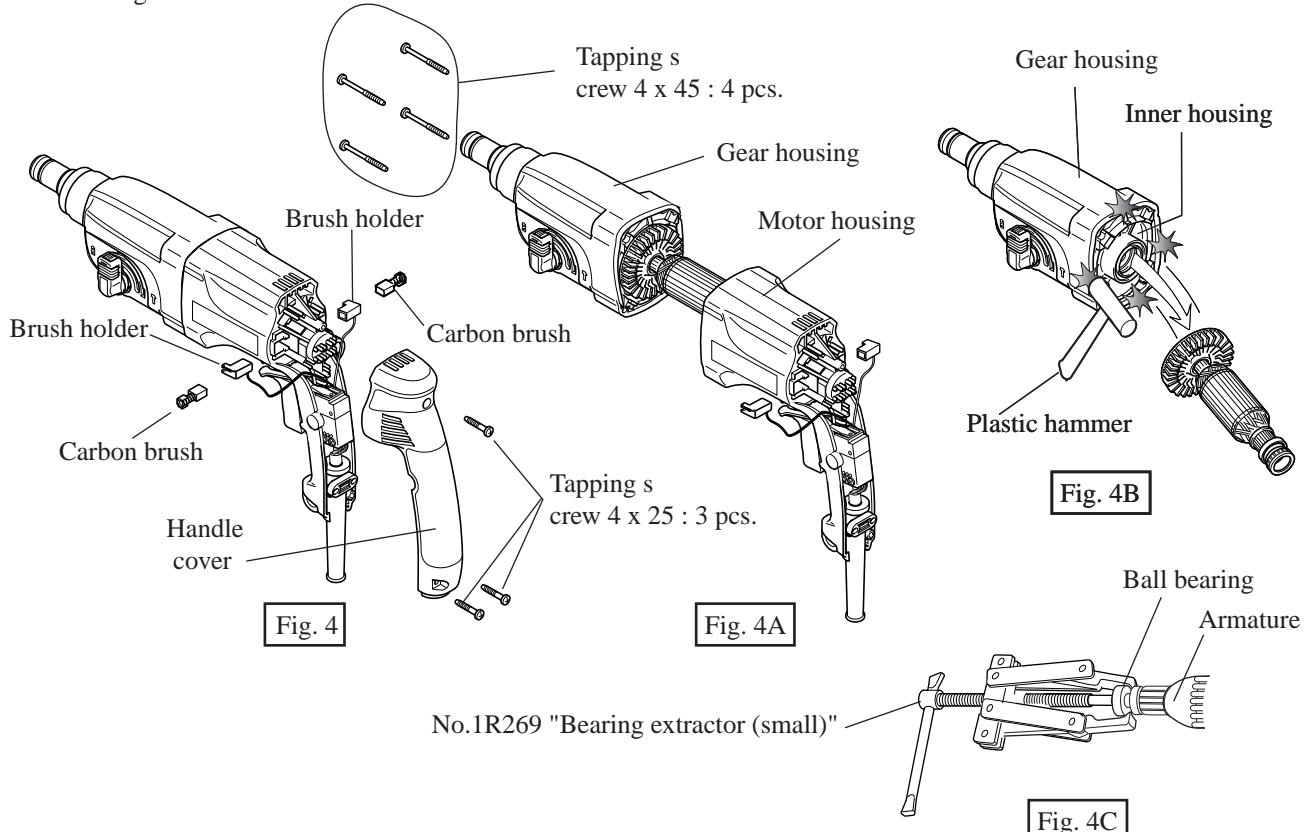
1. Apply grease to the pin of change lever and O ring 17 referring to < 1 > Lubrication at page 2.
2. Assemble compression spring 3 and lock button to change lever. And temporarily assemble cap to the position illustrated in Fig. 3 in order to stop springing off of lock button. Do not forget to assemble O ring 17. See Fig. 3.
3. Insert the change lever in which compression spring 3 and lock button have been temporarily fixed with cap, into the assembling hole of gear housing. See Fig. 3A. The change lever can not be inserted completely in this stage.
4. Pressing the change lever, turn it in the direction of drill mode. Then, it can be inserted completely in any position of area B. See Fig. 3B.
5. Turn the change lever to the area C. See Fig. 3B. And assemble cap completely to the original position of change lever, by pressing to gear housing side.



If the change lever can not be inserted completely in any position of area B, pressing lock button, turn it to the direction of drill mode again in order to insert completely in any position of area B.

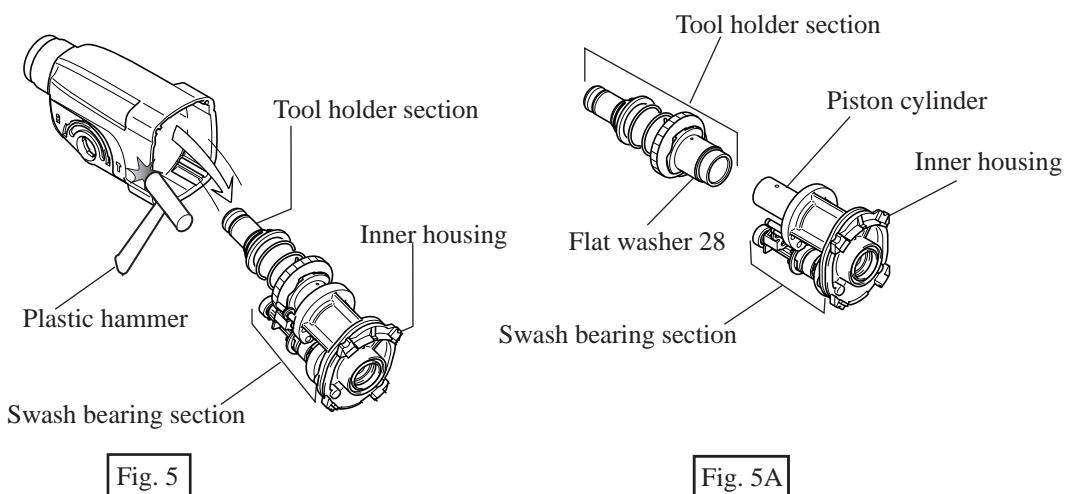
< 6 > Disassembling armature

1. Disassemble handle cover by unscrewing tapping screw 4 x 25. And disassemble carbon brushes as illustrated in Fig. 4.
2. Separate gear housing together with armature, from motor housing by unscrewing tapping screws 4 x 45 as illustrated in Fig. 4A.
3. Slightly hitting the edge of gear housing with plastic hammer, remove armature from inner housing assembled in gear housing. See Fig. 4B.
4. Ball bearings of fan side and commutator side can be disassembled with No.1R269 "Bearing extractor (small)". See Fig. 4C.

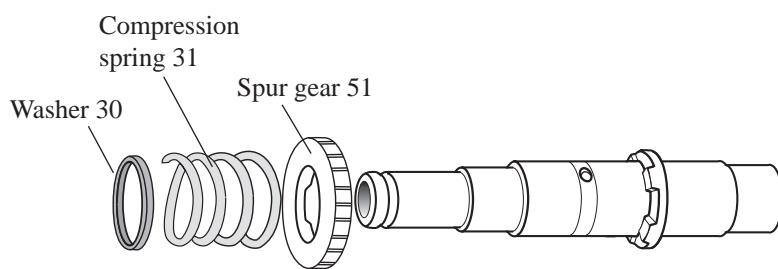
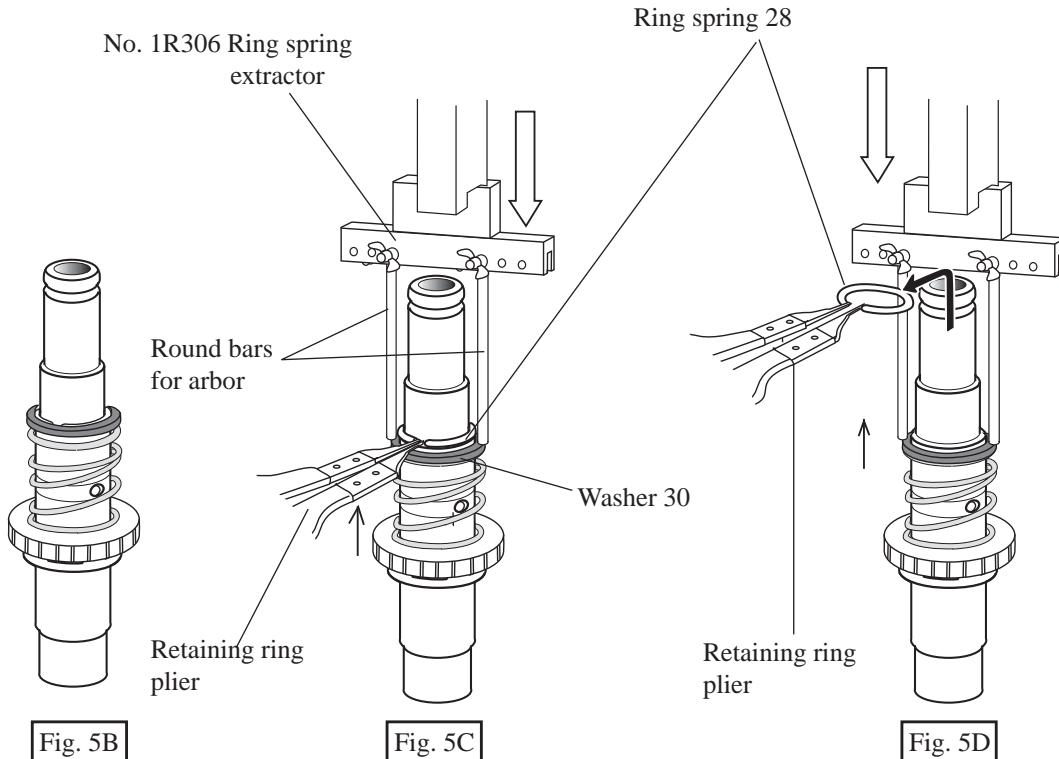


< 7 > Disassembling tool holder section

1. Disassemble change lever from gear housing as mentioned in < 4 > Disassembling change lever at page 4.
2. Separate gear housing from motor housing as illustrated in Fig. 4 and Fig. 4A. And disassemble armature as illustrated in Fig. 4B.
3. Disassemble inner housing from gear housing as illustrated in Fig. 5.
4. Separate tool holder section from inner housing as illustrated in Fig. 5A. Pay attention, not to lose flat washer 28, when separating tool holder section.



5. Ring spring 28 can not be removed without pressing washer 30 down to the spur gear 51 side, because it is assembled between tool holder and washer 30. See Fig. 5B.
6. Disassemble ring spring 28 with retaining ring plier, pressing washer 30 down to the spur gear 51 side as illustrated in Fig. 5C and Fig. 5D.
7. Disassemble washer 30, compression spring 31 and spur gear 51 from tool holder as illustrated in Fig. 5E.



< 8 > Assembling tool holder section

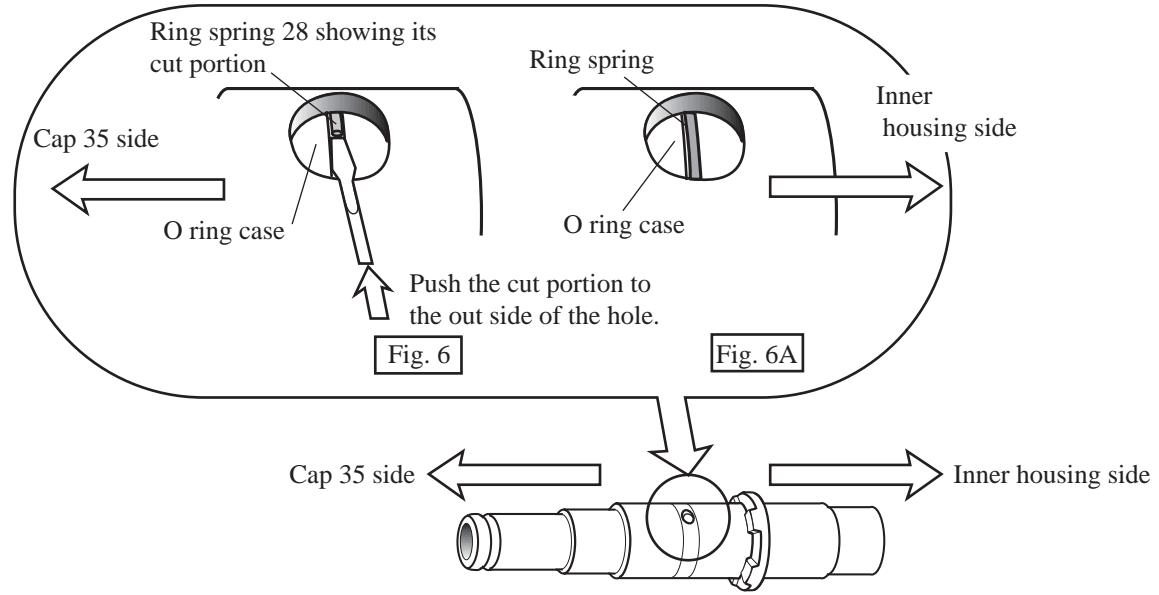
1. Apply grease to spur gear 51 and tool holder referring to < 1 > Lubrication at page 2.
2. Assemble spur gear 51, compression spring 31 and washer 30 to tool holder as illustrated in Fig. 5E.
3. Pressing the washer 30 down to the spur gear 51 side, with arbor press, assemble ring spring 28 as illustrated in Fig. 5D and Fig. 5C.
4. Assemble flat washer 28 as illustrated in Fig. 5A at page 5.
5. Insert piston cylinder of swash bearing section into tool holder. And assemble tool holder section by pressing into inner housing as illustrated in fig. 5A.

► Repair

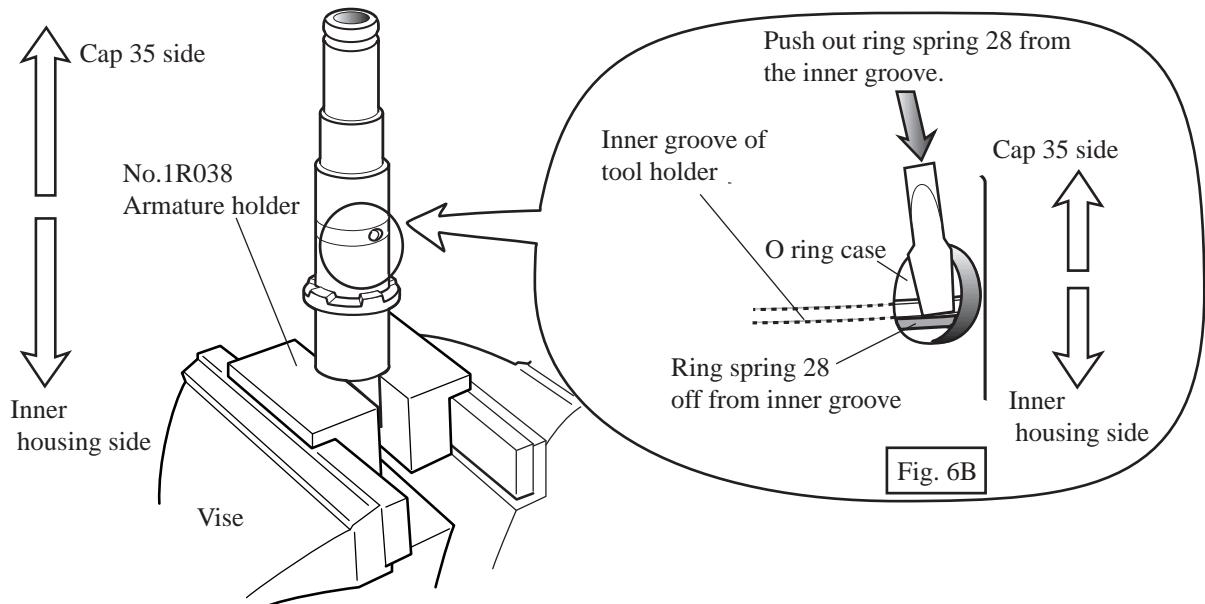
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< 9 > Disassembling impact bolt

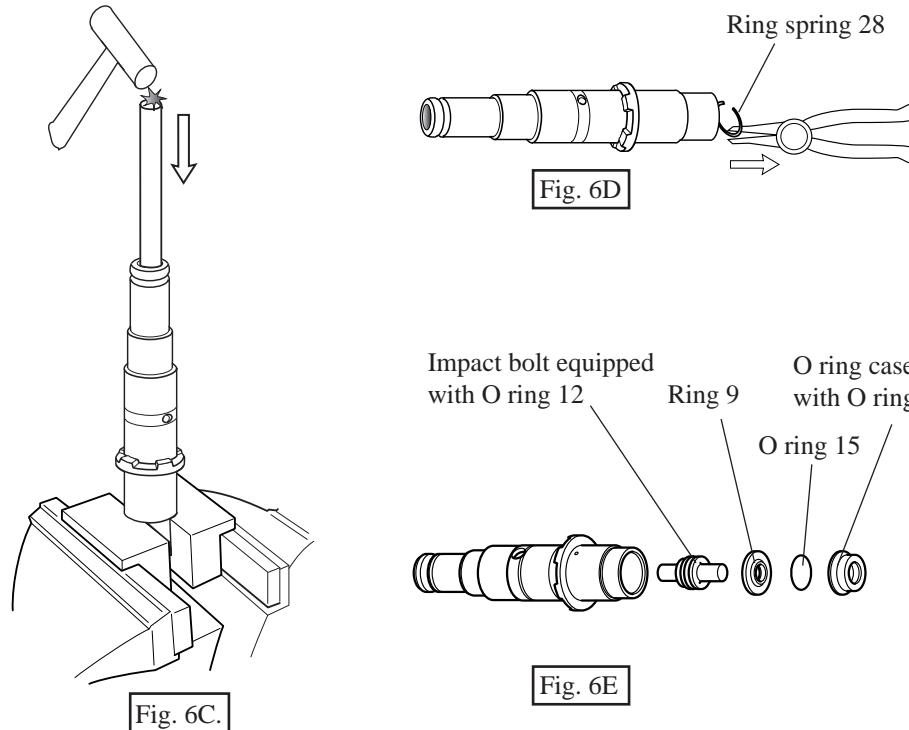
1. Referring to < 7 > Disassembling tool holder section at page 5 and 6, disassemble ring spring 28, washer 30, compression spring 31 and spur gear 51 from tool holder. See Fig. 5, Fig. 5A, B, C, D and E.
2. Push the cut portion of ring spring 28 to the out side of the hole as illustrated in Fig. 6 and Fig. A.



3. Hold tool holder with "No.1R038 Armature holder" and vise. Insert screwdriver between ring spring 28 and O ring case, and push out ring spring 28 from the inner groove as illustrated in Fig. 6B.

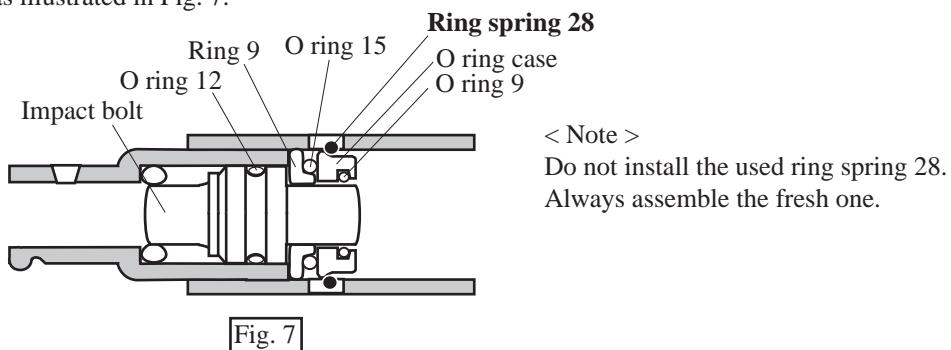


4. Insert "No.1R236 Round bar for arbor" and push ring spring 28 as deep as possible to the inner housing side by striking the round bar for arbor as illustrated in Fig. 6C.
5. Pick up ring spring 28 with plier and take off it from tool holder as illustrated in Fig. 6D.
6. Disassemble the following parts from tool holder as illustrated in Fig. 6E.
 - * O ring case equipped with O ring 9
 - * O ring 15
 - * Ring 9
 - * Impact bolt equipped with O ring 12
7. Clean the inside of tool holder completely.



< 10 > Assembling impact bolt

1. Apply grease to the O rings referring to < 1 > Lubrication at page 2
 - * O ring 9 for O ring case
 - * O ring 15
 - * O ring 12 for impact bolt
2. Insert impact bolt, ring 9, O ring 15 and O ring case with O ring 9 into tool holder as illustrated in Fig. 6E.
3. Assemble ring spring 28 to the inner groove of tool holder by pushing it with screwdriver. Ring spring 28 has to be assembled as illustrated in Fig. 7.



► Repair

< 12 > Disassembling swash bearing

1. Referring to at page 5, disassemble the product in the order of Fig.4, Fig.4A and Fig.4B at page 5.
And separate inner housing together with tool holder section and swash bearing section from gear housing as illustrated in Fig. 8C. Ball bearing 606ZZ can remain in gear housing in this stage. If so, refer to Fig. 8H at page 10.
2. Separate tool holder section from inner housing as illustrated in Fig. 8D.

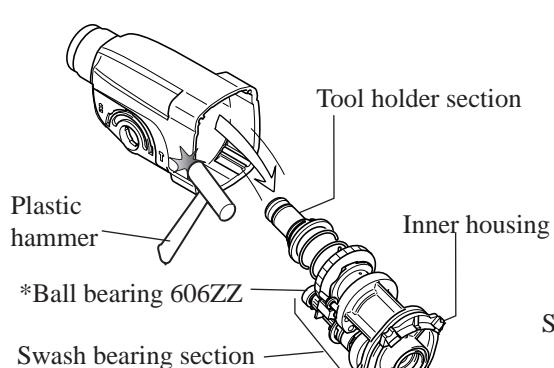


Fig. 8C

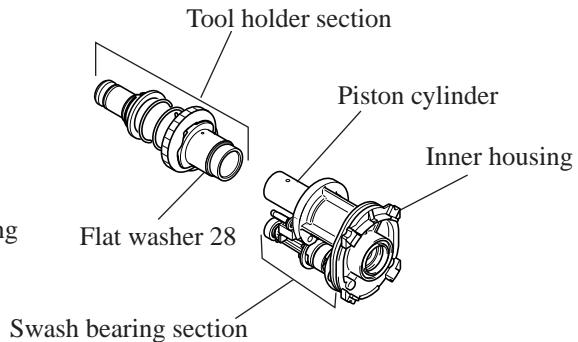


Fig. 8D

3. Disassemble stop ring E-4, flat washer 5 and compression spring 6 with which change plate is fixed, from the pin of inner housing as illustrated in Fig. 8E.

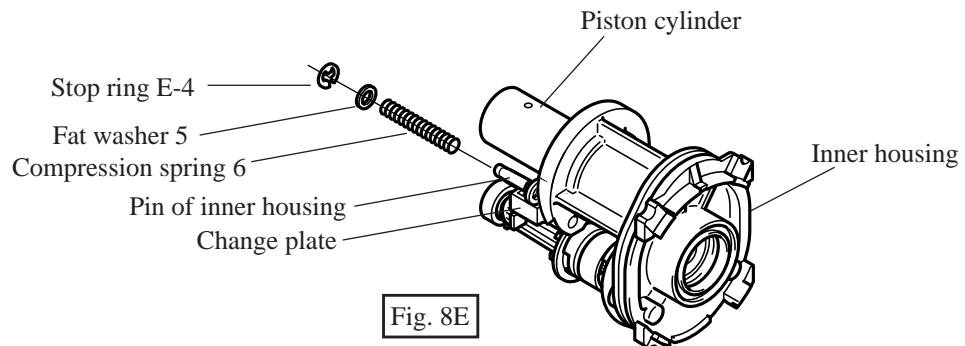


Fig. 8E

4. Swash bearing section is held in inner housing with bearing retainer which is fastened with 2 pcs. of hex socket head bolts M4x12. Take off these hex socket head bolts M4x12 for disassembling swash bearing section.

Hex socket head bolts M4x12

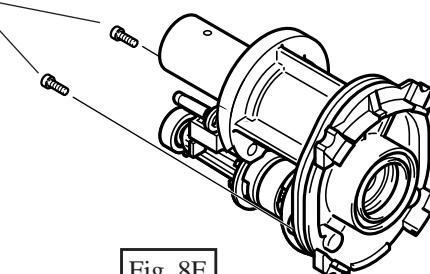


Fig. 8F

5. Bring piston cylinder to the dead point. And , twist the the swash bearing section, with pulling off them from inner housing. Then swash bearing section and change plate can be disassembled from piston cylinder. See Fig. 8G.

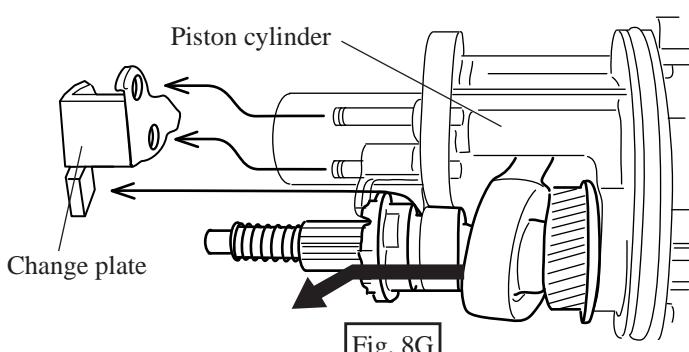


Fig. 8G

6. Reassemble swash bearing section temporarily to gear housing, and hold gear housing as illustrated in Fig. 8H.

So, swash bearing section tilts in the direction of arrow.

Keeping the illustrated position, disassemble swash bearing section by striking the edge of gear housing with plastic hammer. So, ball bearing 606ZZ can be removed together with swash bearing section.

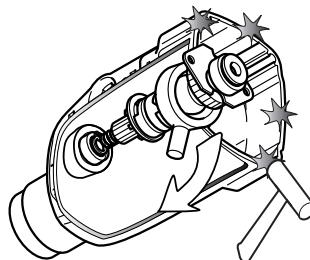


Fig. 8H

7. Swash bearing section can not be disassembled in one action by pressing cam shaft with arbor press, because retaining ring S-7 is assembled between ball bearing 608ZZ and compression spring 7.

Take the following steps for disassembling them.

1. Disassemble ring 8 by pressing with arbor press as illustrated in Fig. 9.

2. Disassemble ball bearing 608ZZ with bearing extractor as illustrated in Fig. 9A.

3. Disassemble flat washer 8 and bearing retainer as illustrated in Fig. 9B.

4. Disassemble helical gear 26 by pressing with arbor press as illustrated in Fig. 9C.

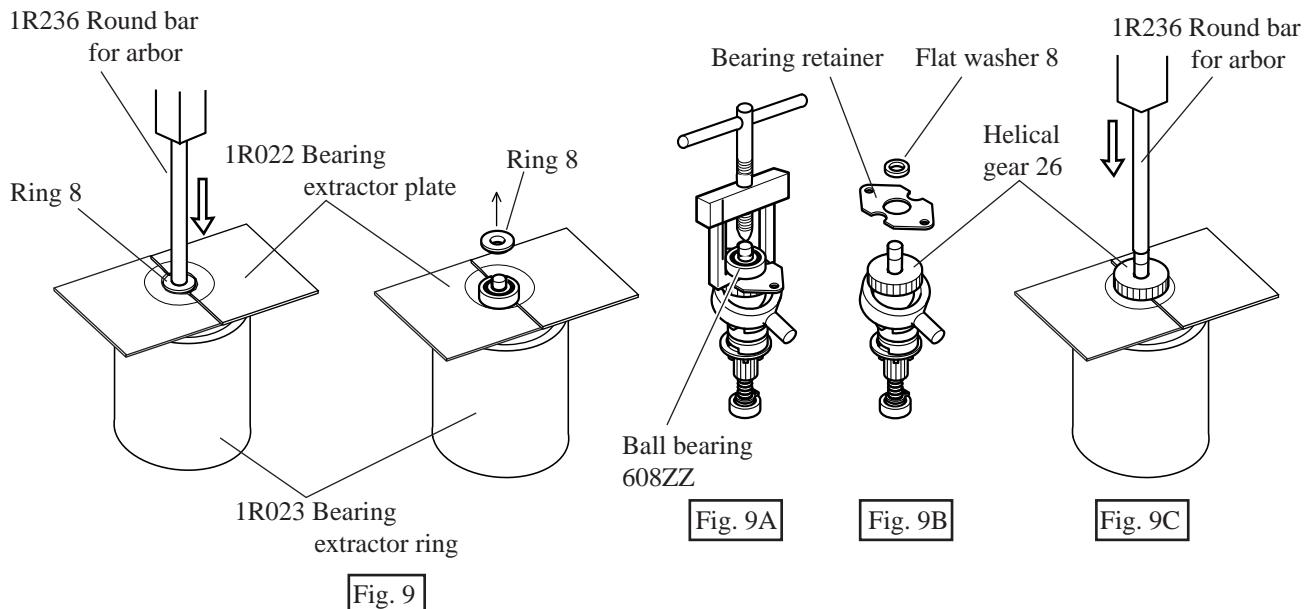
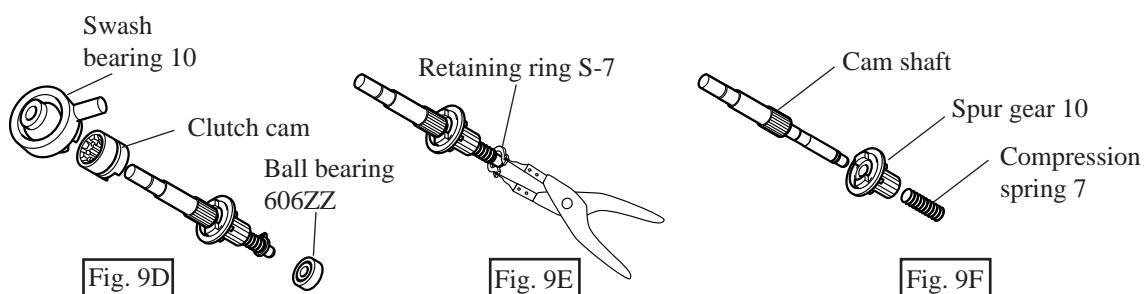


Fig. 9

5. Disassemble swash bearing 10 and clutch cam as illustrated in Fig. 9D. And disassemble ball bearing 606ZZ with bearing extractor as illustrated in Fig. 9D.

6. Disassemble retaining ring S-7 with retaining ring plier as illustrated in Fig. 9E.

7. Separated compression spring 7 and spur gear 10 from cam shaft as illustrated in Fig. 9F.



< 13 > Assembling swash bearing section

1. Apply grease to the parts of swash bearing section referring to < 1 > Lubrication at page 2.
2. Assemble swash bearing 10 by pressing cam shaft with arbor press as illustrated in Fig. 10.
3. Assemble helical gear 26 by pressing cam shaft with arbor press as illustrated in Fig. 10A.
4. Assemble flat washer 8, bearing retainer and ball bearing 608ZZ by pressing cam shaft with arbor press as illustrated in Fig. 10B.
5. Assemble ring 8 by pressing cam shaft with arbor press as illustrated in Fig. 10C.

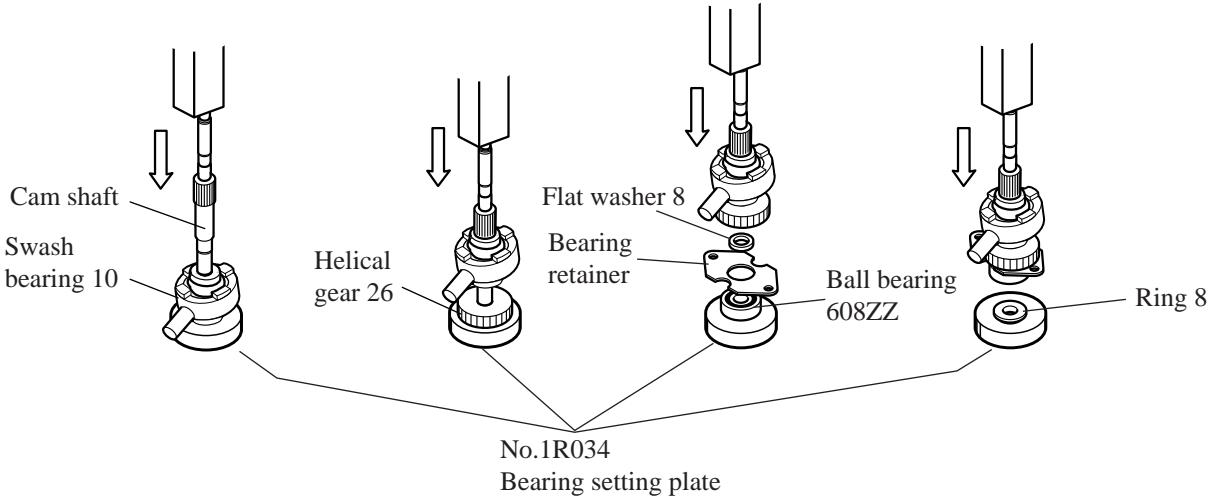


Fig. 10

Fig. 10A

Fig. 10B

Fig. 10C

< 14 > Assembling swash bearing section to piston cylinder

1. Apply MAKITA grease to piston cylinder and swash bearing 10 referring to < 1 > Lubrication at page 2.
2. Assemble 2 pcs. of flat washers 12 and piston joint to piston cylinder as illustrated in Fig. 11.
3. Insert the above piston cylinder into inner housing as illustrated in Fig. 11A.
4. Bringing piston cylinder to the dead point for swash bearing 10, assemble swash bearing 10 to piston cylinder by inserting its pole into the hole of piston joint as illustrated in Fig. 11B.
5. Fasten bearing retainer which has been assembled to swash bearing section, with adhesive hex socket head bolt M4x12, onto inner housing as illustrated in Fig. 11C.

<Note> Do not fasten with the used hex socket head bolt M4x12. Always use the fresh adhesive hex socket head bolt M4x12

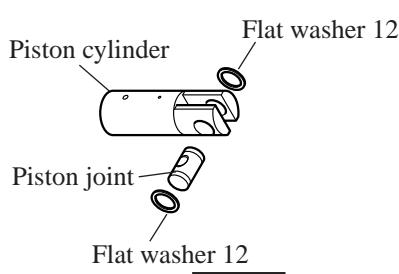


Fig. 11

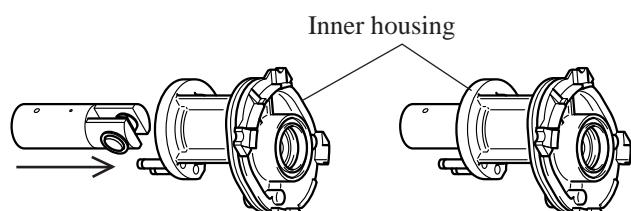


Fig. 11A

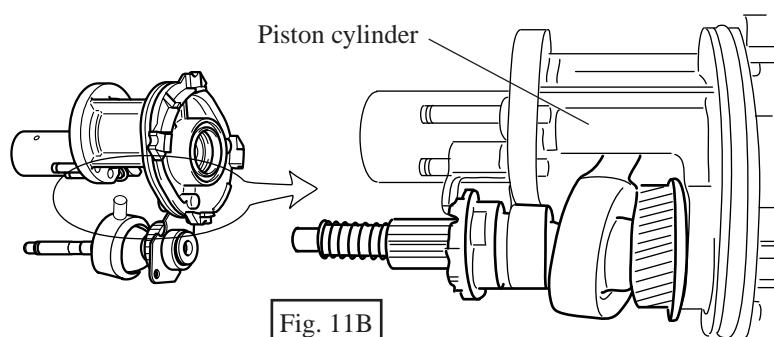


Fig. 11B

2 pcs. of Hex socket head bolts M4x12 for tightening bearing retainer.

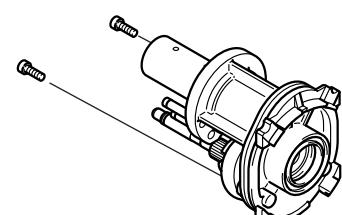


Fig. 11C

6. Set change plate in the groove of clutch cam, and assemble the clutch cam with change plate to cam shaft as illustrated in Fig. 11D.
7. Assemble spur gear 10 to cam shaft as illustrated in Fig. 11E.
8. Assemble compression spring 7 to cam shaft, and fix the parts on cam shaft with retaining ring S-7 as illustrated in Fig. 11F.
9. Assemble compression spring 6 and flat washer 5 to the pin of inner housing. And fix them with stop ring E-5 as illustrated in fig. 11G.
10. Apply 55g of MAKITA grease RA No.1in gear housing.

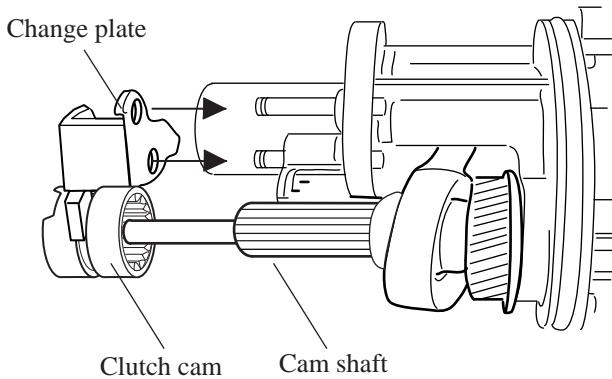


Fig. 11D

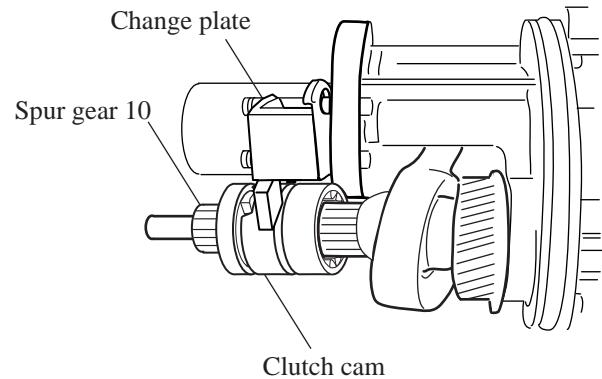


Fig. 11E

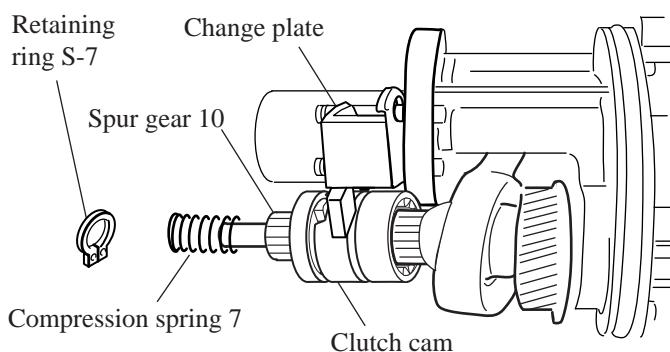


Fig. 11F

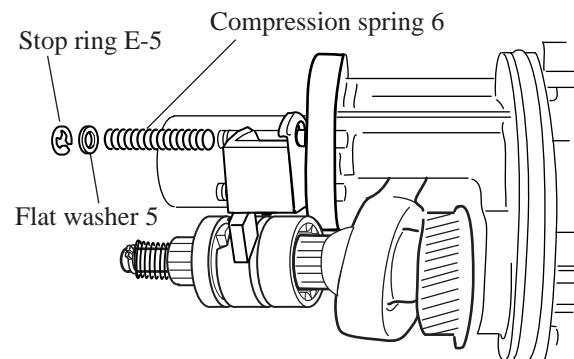


Fig. 11G

< 15 > Disassembling needle bearing complete

Strike the work table with gear housing. Then needle bearing complete can be disassembled from gear housing as illustrated in Fig. 12.

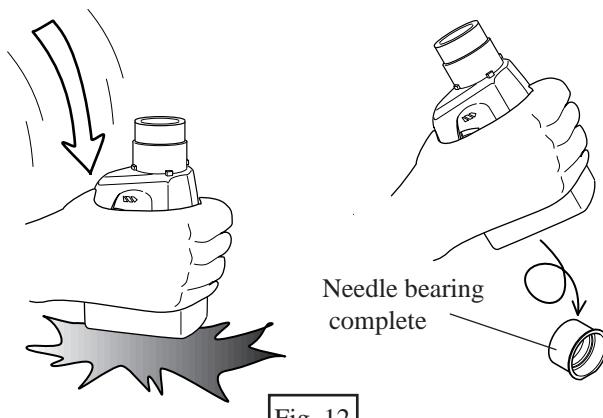
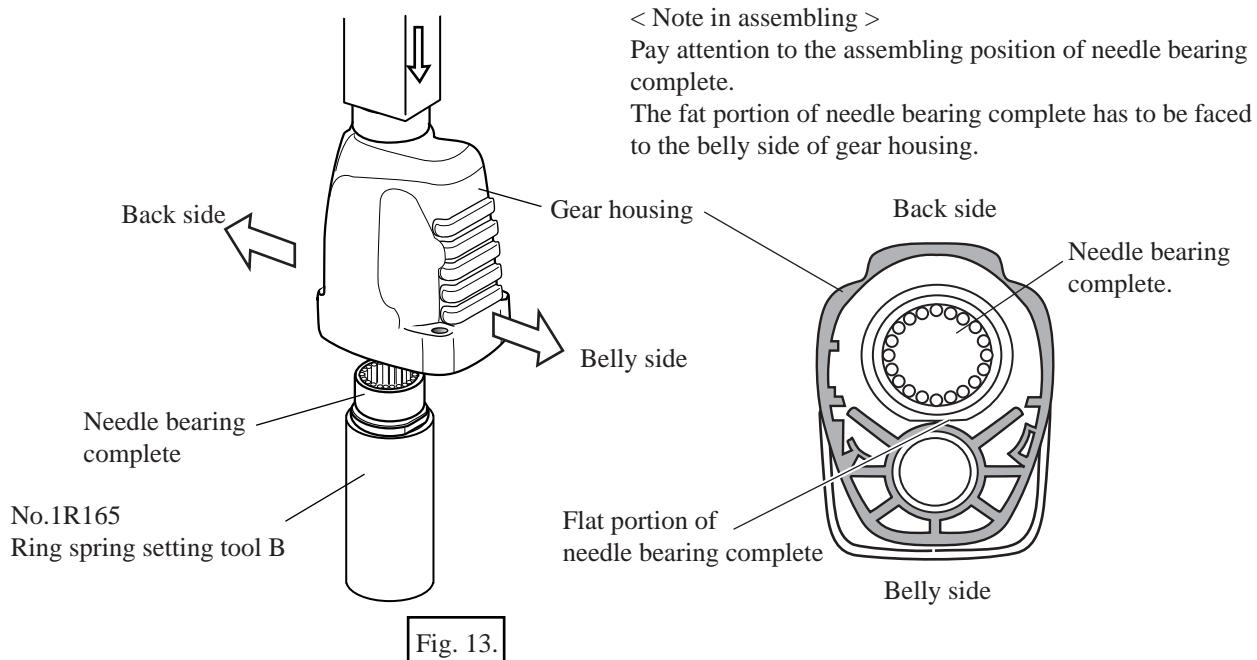


Fig. 12

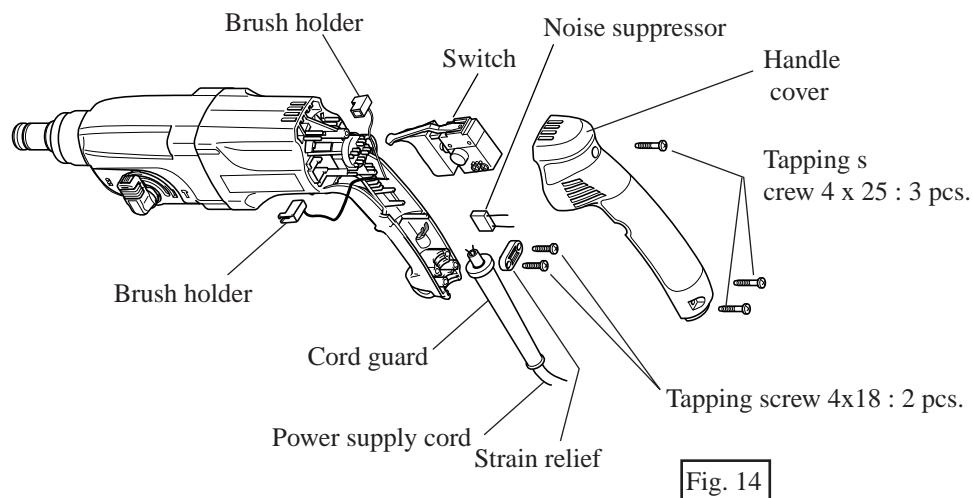
< 16 > Assembling needle bearing complete

1. Apply MAKITA grease RA No.1 to the inside of needle bearing complete.
2. Putting needle bearing complete on No.1R165 "Ring spring setting tool B" press gear housing onto the needle bearing complete with arbor press as illustrated in Fig. 13.



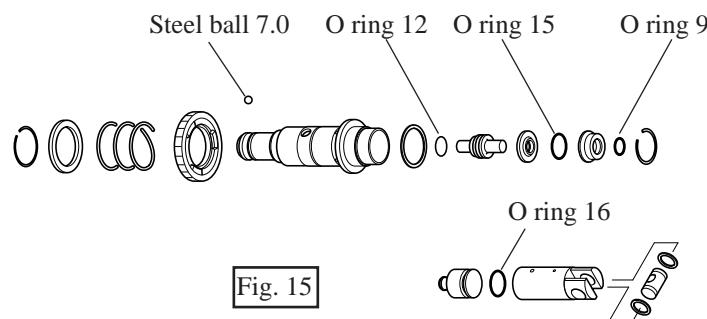
< 17 > Replacing electrical parts in handle

Disassemble handle cover by unscrewing 3 pcs. of tapping screws 4x25, and disassemble strain relief by unscrewing 2 pcs. of tapping screws 4x18 as illustrated in Fig.14.
Then, switch, noise suppressor, power supply cord, etc. can be replaced.



< 18 > Maintenance

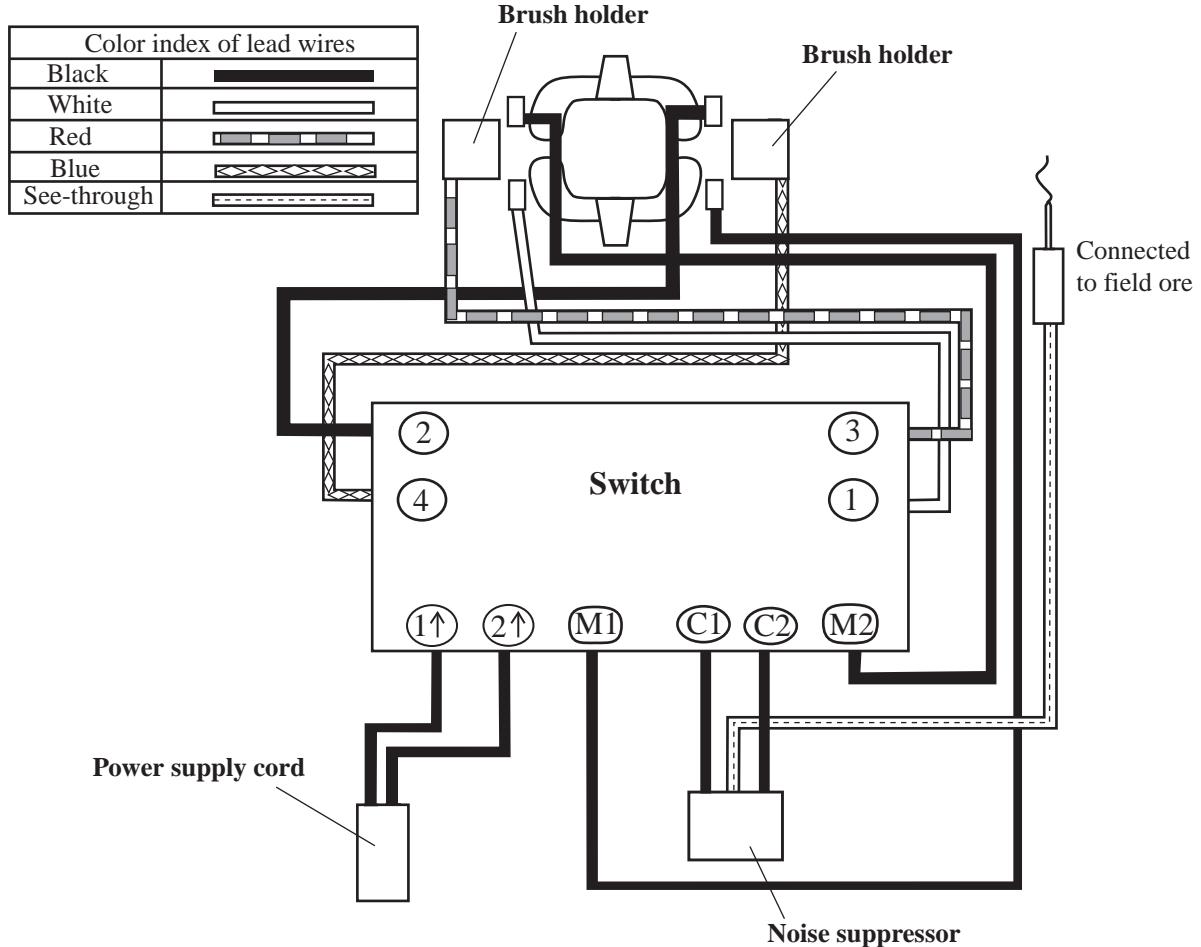
It is recommended to change the following parts, when replacing carbon brushes. See Fig. 15.



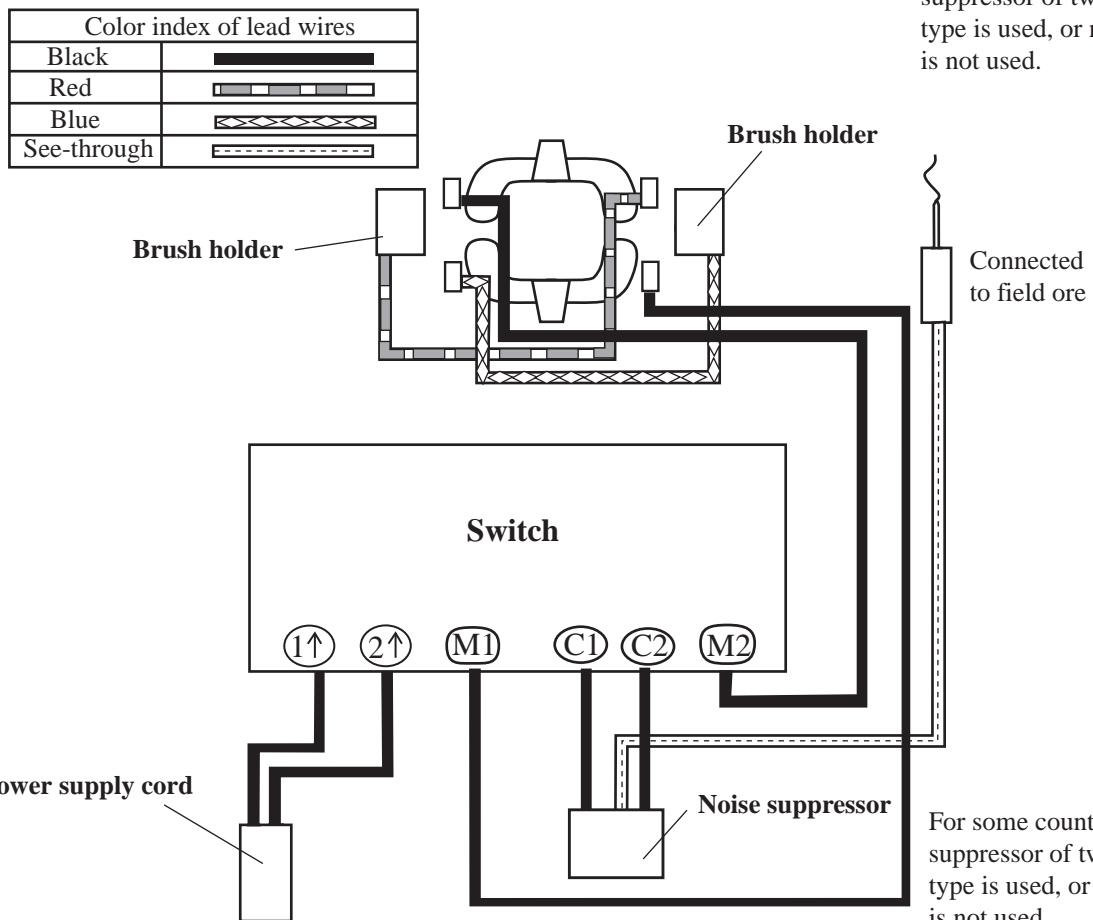
► Circuit diagram

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Model HR2450 with reverse switch



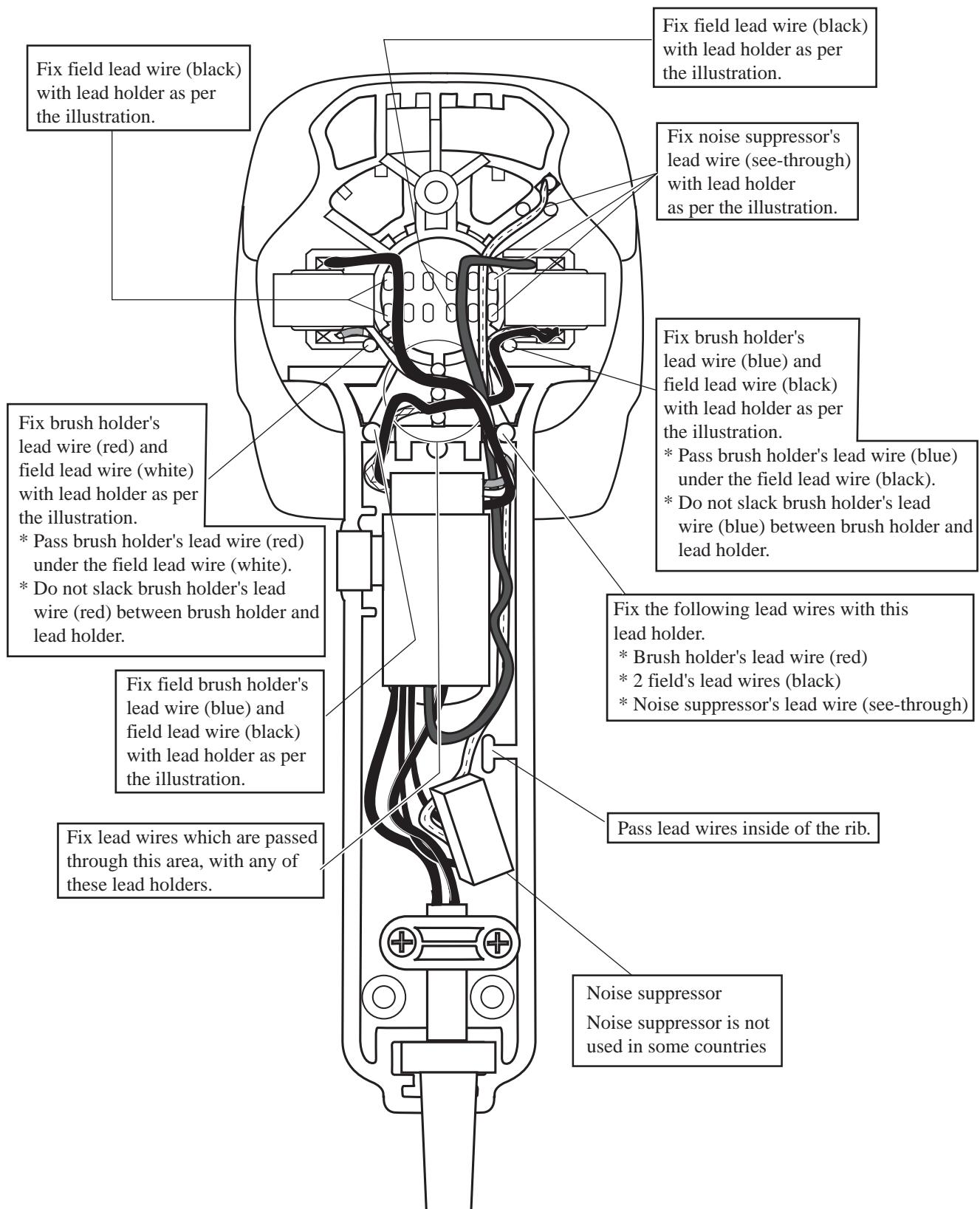
Model HR2451, HR2452 without reverse switch



► Wiring diagram

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Model HR2450 with reverse switch



► Wiring diagram

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Model HR2451, HR2452 without reverse switch

